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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-----------------------|------------------|
| 10/814,575 | 04/01/2004 | Arie Maharshak | P-6626-US | 6914 |
| 49443 | 7590 | 06/16/2006 | EXAMINER | |
| PEARL COHEN ZEDEK, LLP 1500 BROADWAY 12TH FLOOR NEW YORK, NY 10036 | | | FRIEDHOFER, MICHAEL A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2832 | |

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------------------------|----------------------------------|--|
| Office Action Summary | Application No. 10/814,575 | Applicant(s) MAHARSHAK ET AL. | |
| | Examiner Michael A. Friedhofer | Art Unit 2832 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24, 26 and 27 is/are rejected.
- 7) ☒ Claim(s) 10 and 25 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4/1/04</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because the abstract should be a single paragraph. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

2. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 18, line 1 "said conductive element" has no antecedent basis.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 9, 11-13, 19-21, 24, 26, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakatani et al.

Nakatani et al discloses in figures 1-3b a circuit board comprising a first conductive area on one side of board 1 and a second conductive area on a second side of the board 1; a plurality of through holes 13 are formed from the one side through to the second side; and a conductive material 3 substantially filling the plurality of holes and capable of forming an electrical connection between the two conductive areas. The diameter of the holes is approximately

equal to the thickness of the board. The conductive material is applied to the board in a liquid form. The holes are formed in the board before the conductive areas are applied to the board. The conductive material includes particles of a nonconductive material. The first conductive area is a conductive line. The substrate is porous. The first and second conductive areas overlap. There are at least two holes. The conductive material is either painted or silk screened onto at least one side of the board. The total electrical current passing through the conductive material substantially filling the plurality of holes is above a threshold current. The conductive material is forced into the holes by painting or silk screen painting via a capillary action.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakatani et al.

Nakatani et al does not specifically disclose painting both side of the board either alternately or simultaneously.

It would have been a matter of engineering design choice not affecting the operation, function, or structure of the circuit board as long as substantially all of the hole is filled by the conductive material.

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7. Claims 7, 8, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakatani et al in view of Higuchi et al.

Nakatani et al discloses all of the claimed limitations with the exception of the circuit board being a flexible non-conductive substrate and that the holes be less than 2 mm.

Higuchi et al teaches the filling of the vias or through holes in a flexible printed circuit board completely for providing the connection between conductive areas on either side of the nonconductive substrate. The holes are less than 2 mm in diameter.

It would have been obvious to one of ordinary skill in the art to apply the teachings of Higuchi et al to Nakatani et al to utilize the same method of filling the via holes in a circuit board for a flexible circuit board because the purposes of both references is to ensure a proper connection between the two conductive areas.

8. Claims 15, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakatani et al in view of Yamazaki et al.

Nakatani et al teaches all of the claimed limitations with the exception of specifically stating that the board is utilized in a switch.

Yamazaki et al teaches the use of a circuit board 1 having via holes filled with conductive material 13 so that the switches may be connected to circuits on the opposite side of the board.

It would have been obvious to one of ordinary skill in the art to apply the teachings of Yamazaki et al to Nakatani et al to utilize the board of Nakatani et al in a switch because the neither the purpose of the switch nor the purpose of the circuit board would be altered and the board of Nakatani et al provides a process for completely filling the holes to ensure a positive connection between the two sides of the board.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakatani et al in view of Yamazaki et al as applied to claims 15 and 16 above, and further in view of Higuchi et al and Kawakubo.

Nakatani et al as modified by Yamazaki et al teach all of the claimed limitations with the exception of the circuit board being a flexible printed circuit.

Higuchi et al teaches that the via holes in flexible printed circuits are filled to provide a sure connection between conductive areas on both sides of the board.

Kawakubo teaches that both printed circuit boards and flexible printed circuits may be utilized in the formation of switches.

It would have been obvious to one of ordinary skill in the art to apply the teachings of Higuchi et al and Kawakubo to Nakatani et al as modified by Yamazaki et al to utilize a flexible printed circuit because neither the purpose of the switch or the board would be altered by the use of a flexible printed circuit rather than a circuit board in which the holes in Higuchi et al are filled for the same purpose as Nakatani et al and Kawakubo teaches the interchangeability of the types of boards within switches.

Allowable Subject Matter

10. Claims 10 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach or suggest adding an adhesive capable of holding a portion of the first conductive area onto the first side of the board nor that in the method of making includes the step of anchoring a portion of the first conductive area on a first side of the substrate with the conducting liquid.

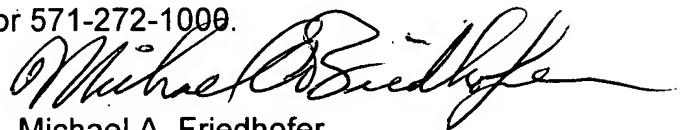
12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Robinson et al, Komrska et al, Noda et al, Yamakawa et al, Suzuki et al, and Hishinuma et al teach various circuit board structures in which the through holes are filled either partially or completely with a conductive material for connecting conductive areas on both sides of the circuit board.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Friedhofer whose telephone number is 571-272-1992. The examiner can normally be reached on Mon-Fri 6:00 - 2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on 571-272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael A. Friedhofer
Primary Examiner
Art Unit 2832

maf